

In the claims:

Please amend claims 1, 2, 16 and 17 as follows.

1. (Amended) A conductive adhesive composition comprising:
in the range of about 5 up to about 65 % by volume of a high melting point metal, wherein
said metal is in the form of a substantially spherical powder,
in the range of about 5 up to about 60 % by volume of a low melting point metal or metal
alloy, wherein said metal or metal alloy is in the form of a substantially spherical
powder,
in the range of about 2 up to about 60 % by volume of a chemically protected crosslinking
agent, wherein said chemically protected crosslinking agent is an acid or strong base
which has been chemically modified by the addition of a chemically or thermally
triggered species to become reactive only at or near the time the low melting point
metal or metal alloy, or an alloy thereof with said high melting point metal melts,
in the range of 0 up to about 35 % by volume of a resin,
in the range of 0 up to about 35 % by volume of a reactive monomer or polymer that is not
the same as said resin, and
in the range of 0 up to about 10 % by volume of a metal additive,

with the proviso that said composition must contain either said resin and/or said reactive
monomer or polymer, or, in the alternative, said resin and/or said reactive monomer or polymer can be
combined with said chemically protected crosslinking agent to produce a single component of said
composition.

2. (Amended) A conductive adhesive composition according to claim 1, wherein said
composition comprises:
in the range of about 8 up to about 60 % by volume of [a] said high melting point metal,

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in the range of about 6 up to about 40 % by volume of [a] said low melting point metal or metal alloy,

in the range of about 7 up to about 50 % by volume of [a] said chemically protected crosslinking agent,

in the range of 0 up to about 12 % by volume of [a] said resin,

in the range of 0 up to about 28 % by volume of [a] said reactive monomer or polymer, and

in the range of 0 up to about 5 % by volume of [a] said metal additive.

16. (Amended) A conductive adhesive composition according to claim 1, wherein said resin is selected from an epoxy, a phenolic, a phenolic novalac [(both phenolic and cresolic)], a cresolic novalac, a polyurethane, a polyimide, a maleimide, a cyanate ester, a polyvinyl alcohol, a polyester, a polyurea, an acrylic, a polyamide, a polyacrylate, a polysiloxane or a cyanoacrylate[s].

17. (Amended) A conductive adhesive composition according to claim 1, wherein said resin is selected from an epoxy, a phenolic, a phenolic novalac [(both phenolic and cresolic)], a cresolic novalac, a polyimide, a maleimide, a cyanate ester, a polyester, a polyamide or a polysiloxane[s].

REMARKS

In accordance with the present invention, Applicants provide adhesive compositions useful for attachment of electrical and thermal components to suitable substrates. The combination of transient liquid phase sintering (TLPS) and a permanent adhesive flux binder provides the advantages of both conventional soldering technology and conductive adhesives. This hybrid approach delivers electrical and thermal conduction through sintered metal joints, as well as mechanical properties based on a tailorable polymer matrix. Invention transient liquid phase sintering conductive adhesives can utilize conventional dispensing, placement, and processing equipment. During the reflow process, metal powders in the composition undergo interparticle sintering as well as alloying to the contact pads.